REMARKS/ARGUMENTS

Reconsideration of this application is respectfully requested.

It is noted that this response is being submitted in the fourth month after the mailing date of the Office Action. Accordingly, Applicant requests a one-month extension of time in which to file this response. In connection with the one month extension of time, enclosed herewith is a check in the amount of $110.00 as required under 37 CFR § 1.17(a)(1).

This application contains claims 1-12. Claims 3, 4, 7 and 12 have been withdrawn from further consideration. This amendment cancels claims 9 and 11. The rejection of claims 1, 2, 5, 6, and 8 is responded to herein.

Specification

The Office Action indicates that this application does not contain an Abstract. Included herewith on a separate sheet is an Abstract for this case.

The Office Action objects to the title of the invention as being not descriptive. Please change the title to this case to "Angle Head Grinding Apparatus."

Drawings

The drawings are objected to because it is unclear how the computer 50 is structurally connected to the grinding machine. Included herewith for the Examiner's approval are revised drawings showing conventional connections between the computer 50 and the elements of the grinding apparatus.

The drawings are objected to under 37 CFR § 1.83(a) which requires that all features specified in the claims be shown in the drawings. Claims reciting a coolant

supply unit are either withdrawn from consideration or are cancelled by this amendment. Accordingly it is believed that the grounds for this objection have been removed.

The drawings also correct the showing of the optional gauge 53 in Figs. 1 and 2. The optional gauge 53 is mentioned in the specification on page 8 paragraph 4, line 3. This element is mistakenly shown as 54 in Figs. 1 and 2. However, reference numeral 54 is used to designate the line of action of the grinding wheel in Fig. 1. Thus, the proposed drawings changes change the reference numeral for the gauge from 54 in Figs. 1 and 2 to 53.

The drawing changes also include input lead lines 52a and 53a connecting the gauges 52 and 53 to the computer 50. It is noted that the specification at page 8, the fourth paragraph thereof, describes computer 50 receiving signals from one or more gauges such as 52 and optionally 53 to control the motion of the platform 14 and the wheel head 26. Thus it is believed that the proposed changes to the drawings introduce no new matter to the specification.

Claim Rejections under 35 U.S.C. 102

Claims 8 and 11 are rejected under 35 U.S.C. § 102(b) as being anticipated by Ohta et al. This rejection is respectfully traversed.

Claim 8 clearly recites that the grinding wheel is mounted for rotation about an axis which throughout remains parallel to the workpiece axis of rotation. This limitation is clearly missing from the Ohta reference which shows the grinding wheel G having a wheel shaft 121 which is not parallel to the axis of rotation Z of the workpiece. Thus, the rejection of claim 8 under 35 U.S.C. § 102 is in error and should be withdrawn.

Claim 11 is cancelled.

Claims Rejections 35 U.S.C. 103

Claims 1 and 2 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Ohta et al in view of Imai et al and Wirz (4,475,319). This rejection is respectfully traversed.

In describing what is shown by Ohta et al, the Examiner says that the grinding wheel G in Ohta rotates about an axis which remains parallel to the workpiece axis of rotation. This is not correct. The wheel G in Ohta rotates about an axis which is at an angle of approximately 45 degrees to the axis Z, the workpiece axis of rotation. Thus, Ohta is deficient in showing this feature of applicant's invention.

The patent to Wirz (4,475,319) does not cure the deficiency of the Ohta reference. The patent to Wirz (4,475,319) is used by the Examiner to show a grinding wheel mounted on a wheelhead having drive means for moving the wheelhead relative to the workpiece parallel to the X axis and parallel to the Z axis.

Wirz discloses an apparatus and process for dressing a single or multiple grooved worm or threaded workpiece with a single or multiple grooved worm or threaded dressing tool. As shown in Fig. 7, a screw-like dressing tool 1 is mounted on a slide 20 which may be moved in the X and Y directions. The Wirz apparatus is intended for machining a worm type or threaded type workpiece by means of a worm type or threaded type dressing tool. This is not at all the same as applicant's invention in which a grinding wheel is used to grind the cylindrical surface of a workpiece and an adjacent annular shoulder surface of the workpiece at the same time. In applicant's invention, the

workpiece is a smooth elongated cylindrical surface having an annular shoulder surface extending radially therefrom. This is not at all the same as the worm-like workpiece shown in Wirz. As shown in applicant's drawing figures, a grinding wheel is moved along a line of action which is at an angle to both the X and Y axis with the result that a cylindrical surface of a workpiece and an annular shoulder surface are ground at the same time. No such device is shown by Wirz.

The reference to Imai et al is cited to show a grinding wheel that is mounted for rotation about an axis which remains parallel to the axis of rotation of a workpiece along a selected line of action into engagement with the workpiece as shown in Figure 2.

Imai et al has nothing at all to do with applicant's invention as disclosed and claimed. In Imai, a grinding wheel G is moved relative to the surface of a rotating workpiece W so that the entire length of the workpiece W can be ground to a uniform diameter. As shown in Figure 3 of Imai, the grinding wheel has a tapered grinding surface 31 and a straight grinding surface 30 and the entire workpiece is ground by the straight grinding surface so that the entire workpiece is uniformly cylindrical. Imai et al is not directed to the problem of grinding an annular shoulder on a workpiece at the same time that the cylindrical surface of the workpiece is ground. In Imai et al, there is no angle of attack of the grinding wheel relative to the workpiece, but rather the grinding wheel is lowered onto one end of the workpiece surface in the X direction and then advanced along the length of the workpiece in the Z direction until the entire workpiece is ground to have a uniform cylindrical surface. Thus, the combination of the references to Ohta et al, Wirz and Imai et al fails to teach, show, or render obvious applicant's

invention as disclosed and claimed.

None of the references show a grinding wheel which is a moved along an action line into engagement with a workpiece for grinding a cylindrical surface of a workpiece and a radial surface of the workpiece in which the grinding wheel has an axis of rotation which is parallel to the axis of rotation of the workpiece. Moreover, the combination of the references to Ohta, Wirz and Imai do not teach such construction. In Imai, the grinding wheel is dragged across the length of a rotating, cylindrical workpiece. Combining the teaching of Imai with Wirz would result in the teeth of the worm in Wirz being ground away. Although Wirz shows the dressing tool mounted on a slide which is actuated for movement along the X and Y axis, the workpiece of Wirz is totally different than the workpiece shown in either Imai or Ohta and thus the combination of the three references is unlikely, and even if combined, does not teach applicant's device as disclosed and claimed.

With regard to claim 2, the Examiner states that Ohta et al discloses a line of action of the wheel which is 45 degrees. However, Ohta does not show a wheel that is mounted for rotation about an axis which remains parallel to the axis of rotation of the workpiece. Claim 2 depends upon claim 1 and claim 1 clearly contains this limitation. Thus, Ohta et al does not show the invention as claimed by applicant's claim 2.

Claim 9 is rejected under 35 U.S.C. § 103 as unpatentable over Ohta et al in view of Imai et al and Jankowski as applied to claims 1 and 2 and further in view of Iwabuchi. This rejection is respectfully traversed.

The Examiner's rejection is not clear since Jankowski is not applied to claims 1

and 2 and there are two Jankowski references cited by the Examiner in this case. Accordingly, it is not certain which Jankowski reference the Examiner is referring to.

Nevertheless, both Jankowski references are directed to methods and apparatus for the generation of modified grinding worms. The workpieces shown and described in the Jankowski references are not at all like applicant's workpiece, and the apparatus and methods shown and described by Jankowski would not be suitable for use with applicant's workpiece. Applicant's invention is directed to a machine for grinding a cylindrical surface on a workpiece at the same time as grinding a radial surface on a workpiece. This is neither shown, taught, nor rendered obvious by either of the Jankowski references.

Claims 5 and 6 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Ohta et al in view of Imai et al. This rejection is respectfully traversed.

With regard to claims 5 and 6, the Examiner admits that Ohta et al fails to disclose a grinding wheel mounted for rotation about an axis which remains parallel to the axis of rotation of the workpiece. The Examiner attempts to cure this deficiency of Ohta et al with the reference to Imai et al. Although Imai et al does show the grinding wheel having an axis of rotation which is parallel to the axis of rotation of the workpiece, the workpiece which is grounded by Imai et al is not at all the same as applicant's workpiece. In Imai et al, the workpiece does not have a radial surface which has to be ground, and in Imai et al, the grinding apparatus is not designed to grind a radial surface of a workpiece. Imai et al teachs that a cylindrical grinding wheel can be dragged across

the surface of a cylindrical workpiece to grind the entire surface of the workpeice to a constant diameter. This is not at all the same as applicant's invention in which a grinding wheel is used to grind both a cylindrical surface of a workpiece and a radial surface of a workpiece. Thus, the combination of Ohta et al with Imai et al fails to teach, show or render obvious applicant's invention as claimed.

Claim 5 as amended recites a grinding wheel having a cylindrical surface that is parallel to the axis of rotation of the grinding wheel and a circular face that is perpendicular to the axis of rotation of the grinding wheel whereby the cylindrical surface of the workpiece can be ground by the cylindrical surface of the grinding wheel and the radial end face of the workpiece can be ground by the circular face of the grinding wheel. No such device is shown by the prior art.

Claim 6 is rejected along the same lines as claim 5, and the Examiner again attempts to the cure the deficiencies of the Ohta et al reference with the reference to Imai et al. For the same reasons advanced for the allowance of claim 5 above, it is believed that applicant's invention as described in claim 6 is neither shown, taught, or rendered obvious by a combination of Ohta et al and Imai et al and thus it is believed that claim 6 should be allowed.

The prior art made of record and not relied on by the Examiner has been reviewed with interest. However, this prior art taken either alone or in combination fails to show, teach, or render obvious applicant's invention as claimed.

For the foregoing reasons it is believed that this Amendment places the claims now appearing in this case in condition for allowance, and an early notice to such effect

is respectfully solicited.

In the event that the Examiner does not agree that the claims are now in condition for allowance, he is courteously invited to contact the undersigned at the number given below in order to discuss any changes which the Examiner believes would lead to an allowance of the claims.

It is not believed that any fees in addition to the fee for the one month extension of time are necessitated by the entry of this amendment. However in the event that any additional fees or charges are required, authorization is hereby given to charge such fees to applicant's Deposit Account No 50-0852. A duplicate copy of this sheet is enclosed.

Respectfully submitted,

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